

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A multi-band monopole antenna, comprising:
an antenna substrate;
a feeding point;
a first conductor for receiving networking signals in the frequency range of about 4.9 GHz to about 5.875 GHz, said the first conductor comprising a polygonal portion having a polygonal shape with an aspect ratio of length to width of less than about 5 to about 1;
the first conductor further comprising a strip portion having a width smaller than a width of the polygonal portion, a first end of the strip portion is connected to the feeding point, and a second end of the strip portion is connected to the polygonal portion;
wherein the polygonal portion comprises at least one notch where conducting material is removed from the polygonal portion for matching the impedance of the antenna; and
a second conductor for receiving networking signals in the frequency range of about 2.4 GHz to about 2.5 GHz, the said second conductor adopting a linear, space-filling, or grid dimension shape, and having a first end connected to the feeding portion; and
a feeding point for connecting the first conductor and the second conductor.
2. (Canceled)
3. (Original) The multi-band monopole antenna of claim 1, wherein the first conductor has an aspect ratio of less than about 3 to about 1.
4. (Original) The multi-band monopole antenna of claim 1, wherein the first conductor has an aspect ratio of less than about 2 to about 1.
5. (Original) The multi-band monopole antenna of claim 1, wherein the first conductor has an aspect ratio of about 3 to about 2.
6. (Original) The multi-band monopole antenna of claim 1, wherein the first conductor receives network signals in the 802.11a band.
7. (Original) The multi-band monopole antenna of claim 1, wherein the second conductor receives network signals in the 802.11bg band.
8. (Original) The multi-band monopole antenna of claim 1, wherein the substrate comprises a 10 mm x 10 mm x 0.8 mm circuit board with a copper base conductor.

9. (Currently Amended) A printed circuit board comprising at least one or more of the multi-band monopole antennas of claim 1 antenna, the at least one multi-band monopole antenna comprising:

an antenna substrate;

a feeding point;

a first conductor for receiving networking signals in the frequency range of about 4.9 GHz to about 5.875 GHz, the first conductor comprising a polygonal portion having a polygonal shape with an aspect ratio of length to width of less than about 5 to about 1;

the first conductor further comprising a strip portion having a width smaller than a width of the polygonal portion, a first end of the strip portion is connected to the feeding point, and a second end of the strip portion is connected to the polygonal portion;

wherein the polygonal portion comprises at least one notch where conducting material is removed from the polygonal portion for matching the impedance of the antenna; and

a second conductor for receiving networking signals in the frequency range of about 2.4 GHz to about 2.5 GHz, the second conductor adopting a linear, space-filling, or grid dimension shape, and having a first end connected to the feeding portion.

10. (Currently Amended) The printed circuit board of claim 9, wherein two or more multi-band monopole antennas are used and conducting material of a ground plane of the printed circuit board located between the antenna attachment points of the two or more antennas is interrupted.

11. (Currently Amended) A symmetrical multi-band monopole antenna, comprising:

an antenna substrate;

a feeding point;

first and second conductors for receiving networking signals in the frequency range of about 4.9 GHz to about 5.875 GHz, ~~said~~ each of the first and second conductors comprising a polygonal portion having symmetrical polygonal shapes with an aspect ratio of length to width of less than about 5 to about 1;

each of the first and second conductors further comprising a strip portion having a width smaller than a width of the polygonal portion, a first end of the strip portion of each of the first and second conductors is connected to the polygonal portion, and a second end of the strip portion of each of the first and second conductors is connected to the feeding point;

wherein the polygonal portion of each of the first and second conductors comprises at least one notch where conducting material is removed from the polygonal portion for matching the impedance of the antenna;

third and fourth conductors for receiving networking signals in the frequency range of about 2.4 GHz to about 2.5 GHz, ~~the~~ said third and fourth conductors adopting symmetrical linear, space-filling, or grid dimension shapes, and having a first end connected to the feeding point; and

a feeding point for connecting the first, second, third and fourth conductors, wherein the first and second conductors are symmetrically oriented with respect to each other about a central axis on the antenna substrate and the third and fourth conductors are symmetrically oriented with respect to each other about the central axis on the antenna substrate.

12. (Cancelled)

13. (Original) The symmetrical multi-band monopole antenna of claim 11, wherein the first and second conductors each have an aspect ratio of less than about 3 to about 1.

14. (Original) The symmetrical multi-band monopole antenna of claim 11, wherein the first and second conductors each have an aspect ratio of less than about 2 to about 1.

15. (Original) The symmetrical multi-band monopole antenna of claim 11, wherein the first and second conductors each have an aspect ratio of about 3 to about 2.

16. (Original) The symmetrical multi-band monopole antenna of claim 11, wherein the first and second conductor receives network signals in the 802.11a band.

17. (Original) The symmetrical multi-band monopole antenna of claim 11, wherein the second and third conductors receive network signals in the 802.11bg band.

18. (Original) The symmetrical multi-band monopole antenna of claim 11, wherein the substrate comprises a 10 mm x 10 mm x 0.8 mm circuit board with a copper base conductor.

19. (Currently Amended) A printed circuit board comprising at least one or more of the symmetrical multi-band monopole antenna, the at least one symmetrical multi-band monopole antenna comprising: antennas of claim 14;

an antenna substrate;

a feeding point;

first and second conductors for receiving networking signals in the frequency range of about 4.9 GHz to about 5.875 GHz, each of the first and second conductors comprising a polygonal portion having symmetrical polygonal shapes with an aspect ratio of length to width of less than about 5 to about 1;

each of the first and second conductors further comprising a strip portion having a width smaller than a width of the polygonal portion, a first end of the strip portion of each of the first and second conductors is connected to the polygonal portion, and a second end of the strip portion of each of the first and second conductors is connected to the feeding point;

wherein the polygonal portion of each of the first and second conductors comprises at least one notch where conducting material is removed from the polygonal portion for matching the impedance of the antenna;

third and fourth conductors for receiving networking signals in the frequency range of about 2.4 GHz to about 2.5 GHz, the third and fourth conductors adopting linear, space-filling, or grid dimension shapes, and having a first end connected to the feeding point; and

wherein the first and second conductors are symmetrically oriented with respect to each other about a central axis on the antenna substrate and the third and fourth conductors are symmetrically oriented with respect to each other about the central axis on the antenna substrate.

20. (Currently Amended) The printed circuit board of claim 19, wherein two or more

symmetrical multi-band monopole antennas are used and conducting material of a ground plane of the printed circuit board located between the antenna attachment points of the two or more antennas is interrupted.

21. (New) The multi-band monopole antenna of claim 1, wherein the at least one notch is adjacent to a connection of the polygonal portion and the strip portion.
22. (New) The multi-band monopole antenna of claim 1, wherein an end of the polygonal portion opposite to an end connected to the strip portion is closer to a second end of the second conductor than to the feeding point.
23. (New) The multi-band monopole antenna of claim 1, wherein the strip portion is arranged at an angle with respect to a portion of the second conductor adjacent to the feeding point, the angle being smaller than about 90°.
24. (New) The printed circuit board of claim 9, further comprising a ground plane, wherein the at least one multi-band monopole antenna is mounted on a portion of the printed circuit board substantially free from the ground plane.
25. (New) The symmetrical multi-band monopole antenna of claim 11, wherein the at least one notch of the polygonal portion is adjacent to a connection of the polygonal portion and corresponding strip portion.
26. (New) The symmetrical multi-band monopole antenna of claim 11, wherein an end of the polygonal portion of the first or second conductor, the end being opposite to the end connected to the strip portion of the first or second conductor, is closer to an end of the third or fourth conductor than to the feeding point.
27. (New) The symmetrical multi-band monopole antenna of claim 11, wherein the strip portion of the first conductor is arranged at a first angle with respect to a portion of the third conductor adjacent to the feeding point, the angle being smaller than about 90°.
28. (New) The symmetrical multi-band monopole antenna of claim 11, wherein the strip portion of the second conductor is arranged at a second angle with respect to a portion of the fourth conductor adjacent to the feeding point, the angle being smaller than about 90°.
29. (New) The printed circuit board of claim 19, further comprising a ground plane, wherein the at least one multi-band monopole antenna is mounted on a portion of the printed circuit board substantially free from the ground plane.